

Introduction

The Physical Activity Questionnaire for adolescents (PAQ-A) is a cost-effective tool to assess physical activity (PA) patterns during adolescence and it has been widely used in research and field settings. Convergent validity of PAQ-A has been confirmed in several countries (Bervoets et al., 2014; Janz, Lutuchy, Wenthe, & Levy, 2008; Martinez-Gomez et al., 2009). However, the construct validity has often been overlooked.

Objective

The aim of this study was to analyze the construct validity of PAQ-A, using maximal oxygen uptake as criterion.

Materials & Methods

One hundred and seventy-eight (n=99 boys, n=79 girls) adolescents (14.2±1.9 years, 21.1±4.1 BMI) participated in this study. A PA score was estimated by PAQ-A and additionally a sport history was recorded. BMI, waist circumference (WC) and fat mass percent (FMP) were assessed by anthropometric measurements as adiposity markers. Aerobic fitness (VO_{2Max}) was assessed by a progressive continuous test (Chester Step Test).

Associations between PA-score and criterions were analyzed by Spearman correlations; a one-way ANOVA was conducted to detect differences between each item level from the PAQ-A; independent sample t tests were used to compare values between boys and girls, and athletes and non-athletes.

Results

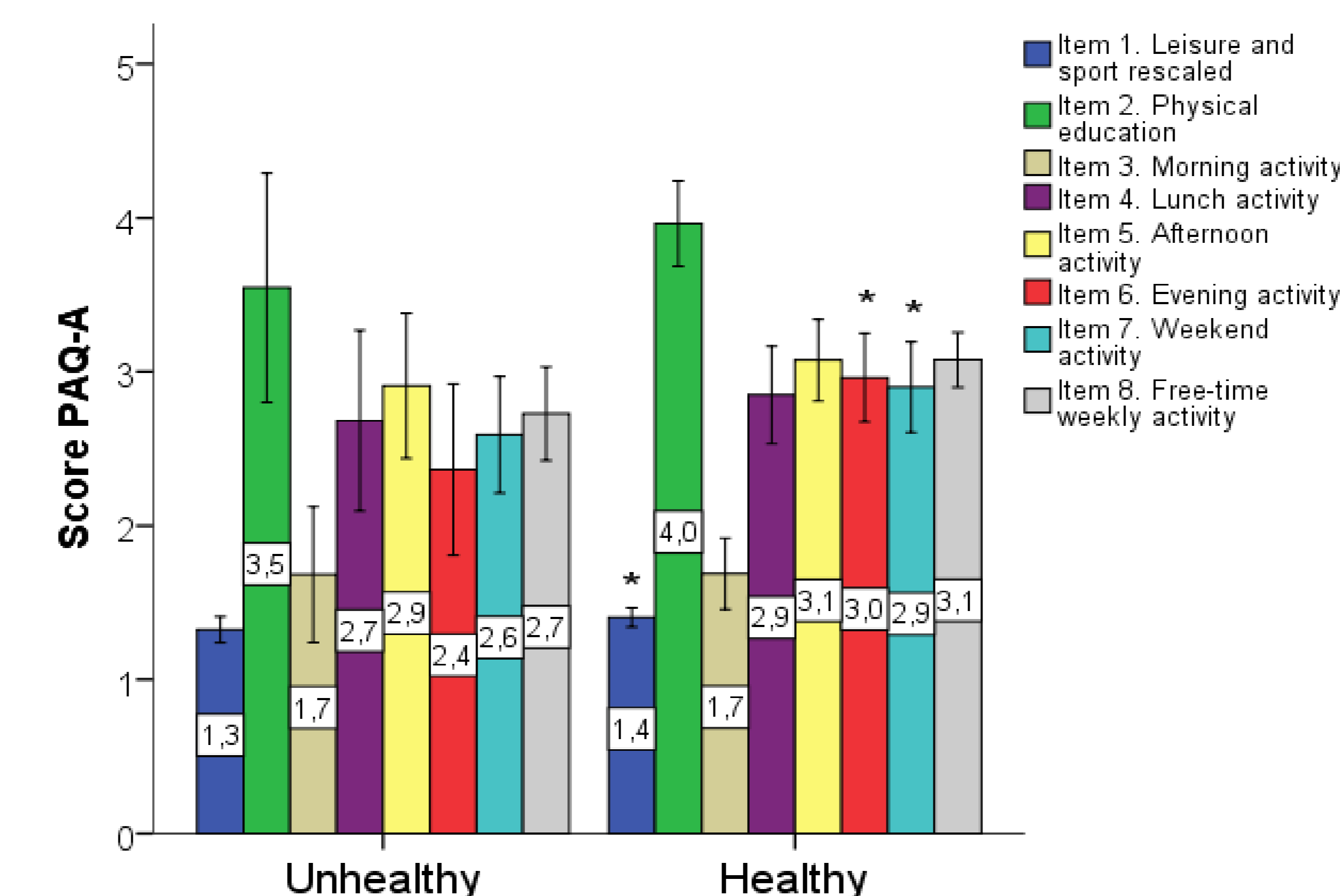
The results showed moderate significant positive correlations between VO_{2Max} and the PAQ-A for total score (rho = 0.28, P<0.01) and items 5, 6, 7 and 8 (rho = 0.24; rho = 0.25; rho = 0.22; rho = 0.25, all P<0.05; respectively).

Adolescents who were enrolled in competitive and organized sport practice had higher scores on the questionnaire (2.8 vs 2.5 average score) as well as higher VO_{2Max} values (37.4 vs 34.2 ml/kg/min) (.).

Table 1. Characteristics of participants by sex.

	All (n=178)	Boys (n=99)	Girls (n=79)
Age (years)	14.2±1.9	14.3±2	14±1.7
Weight (Kg)	55±14.1	57.4±15.1	51.9±12
Height (cm)	160.6±19.7	162.9±12.6	157.7±6.9
BMI (Kg/m ²)	21.1±4.1	21.4±3.9	20.8±4.3
FM (%)	23.6±10.5	21.6±10.7	26.2±9.7
PAQ-A (score)	2.7±0.7	2.8±0.7	2.6±0.8
VO _{2Max} (ml/kg/min)	36±11	238.7±11.7	32.5±9

Values are presented as mean ± SD.
BMI, Body Mass Index; FM, Fat Mass; VO_{2Max}, Maximal Oxygen Uptake.



Graph 1. Differences between healthy and unhealthy groups (VO_{2Max} Criterion) on items of PAQ-A

Discussion & Conclusions

► To describe the level and pattern of PA, a standardized, reliable and valid instrument is essential. Furthermore, in adolescents it is important to use instruments which are non-invasive, easy-to-use and time-saving.

► The construct validity correlation between the PAQ-A total score and the VO₂ peak was moderate. However, it is lower than the previously reported associations between PAQ-A and accelerometry (Martinez-Gomez et al., 2009).

► Our data confirm the PAQ-A had acceptable construct validity when using VO_{2Max} as criterion.

► Moreover, our results suggest that information from some items could be more related with some health markers than others.

Acknowledgments

This work was supported by the Spanish Ministry of Education, Culture and Sport (AP2010-0583), Spanish Ministry of Economy and Competitiveness (DEP2011-30565) and the University of Málaga (Campus of International Excellence Andalucía Tech).

References

- Bervoets, L., Van Noten, C., Van Roosbroeck, S., Hansen, D., Van Hoorenbeeck, K., Verheyen, E., . . . Vankerckhoven, V. (2014). Reliability and Validity of the Dutch Physical Activity Questionnaires for Children (PAQ-C) and Adolescents (PAQ-A). *Arch Public Health*, 72(1), 47. doi: 10.1186/2049-3258-72-47
- Janz, K. F., Lutuchy, E. M., Wenthe, P., & Levy, S. M. (2008). Measuring activity in children and adolescents using self-report: PAQ-C and PAQ-A. *Medicine and Science in Sports and Exercise*, 40(4), 767-772. doi: 10.1249/MSS.0b013e3181620ed1
- Martinez-Gomez, D., Martinez-de-Haro, V., Pozo, T., Welk, G. J., Villagra, A., Calle, M. E., . . . Veiga, O. L. (2009). [Reliability and validity of the PAQ-A questionnaire to assess physical activity in Spanish adolescents]. *Rev Esp Salud Publica*, 83(3), 427-439.